

V.—The Lampyridæ of Borneo. By ERNEST OLIVIER, Correspondent of the Museum d'Histoire Naturelle de Paris.

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THE Lampyrids are beetles belonging to the family Malacodermata, near allies of the Lycids and Telephorids; they are particularly remarkable for the marvellous power they possess of emitting a more or less intense light. This singular property has from the earliest times attracted man's attention, as witness their common names in every country—Glow-Worms, Shine-Worms, Lighting-Bugs, Fire-Flies, Vers-Luisants, Mouches de Feu, Lucioles, Lucier-nega, Fuogola, Liegthmugh, Glühwürmers, Leuchtkafers, Lampyris.

There are a great number of species, which are found in all parts of the earth, except in extreme Arctic regions.

These insects are nocturnal or crepuscular in their habits, appearing only after sunset; in the day-time they stay hidden under mosses, bark of trees, or in decaying vegetation.

The males are always more numerous and more active than the females. In flight they produce a phosphorescent light at regular intervals; that is to say, the flash which they emit only lasts an instant, is extinguished, and re-appears an instant after, the whole phenomenon occupying from half a second to a second. When they have finished their movements, they retire to their hiding-place for the day and become invisible, or, at least, very hard to find.

The females, which have wings fully developed, can readily fly, but they are heavy bodied and are rarely seen in flight, preferring to creep to the tips of blades of grass, upper edges of leaves, rocks, &c., where they remain until mated, brightly shining, awaiting the approach of the males, who run about near them in crowds.

But many females are apterous (wingless), or possess but rudiments of wings and elytra; in appearance they are like larvæ, and are content to crawl slowly in grasses or bushes, principally in wet localities. Their light is not intermittent like that of the winged males, but continuous and very intense with certain species, and is only extinguished when the insect returns to its place of concealment.

The larvæ, which live in grasses and under dead leaves in fresh, damp, and even marshy places, are also luminous.

The luminous organ of these insects occupies principally the ventral surface of the two or three last abdominal segments; it consists of plates of pale white, or yellowish, or reddish colour, which remain glossy after the death of the insects, and even after they have been completely dried.

The method of light emission as well as the intensity and colour of flashes are different for each species; but as these important characteristics can only be observed during life, accurate notes are much desired.

A large amount of scientific work has been done on the means by which the Lampyrids produce their light; many interesting facts have been secured; but, as yet, nothing truly satisfactory is known regarding the precise nature of their luminosity.

The females of *Pyrocellia*, *Diaphanes*, *Lamprophorus*, are wingless and larviform, and, as they do not resemble the males, one cannot tell to which species they belong. To be able to determine them with certainty it is necessary to find them in copulation, or, failing that, to find the males near them. This information, which is so necessary to any study of the beetles of this family, can only be made in those regions which the species inhabit, and I take this opportunity of making an urgent appeal to those in Borneo who are interested in entomology; for, from them alone can we obtain the necessary observations.

In the evening at nightfall, if one walks in fresh and damp places, one will see shining on the grass, decaying vegetation, or on bushes, the light indicative of the female, and nearly always one will find by her side one or more males which will certainly be of the same species. Then one must take them carefully and place both sexes together in a small tube filled with alcohol; thus one will have authentically the two sexes of the same species. One should take care, however, not to place any males captured



later in the same tube as a single female captured at another place or time.

The males can be caught easily with the assistance of a net, and they can also be attracted by a lamp placed on the ground, preferably on a white cloth, on which they will settle, and thus be easily captured.

The Bornean Lampyridæ known up till now are only twenty-five species, belonging to eight genera. One species is described here for the first time.

They can be divided and characterised as follows :—

I. ANTENNÆ LONG, COMPRESSED, PECTINATE OR STRONGLY SERRATE.

*Last ventral segment mucronate.*

1. *Vesta urens*, Gorh.—Scutellum black, legs black.
2. *Vesta proxima*, Gorh.—Scutellum yellow, thighs yellow, tibiæ and tarsi black; thorax sinuate with the front rather acuminate.
3. *Vesta aurantiaca*, Ern. Oliv.—Scutellum rufous; legs wholly black.
4. *Vesta rotundata*, Ern. Oliv.—Scutellum rufous; thighs rufous; knees, tibiæ, and tarsi black; thorax semicircular.

*Last ventral segment semicircular, or truncate, or slightly notched.*

5. *Pyrocælia terminata*, Gorh.—Thorax yellow; elytra yellow with black tip.
  6. *Pyrocælia morosa*, Ern. Oliv.—Thorax yellow; elytra fuscous with yellow margin.
  7. *Pyrocælia opaca*, Ern. Oliv.—Thorax yellow; elytra wholly black; abdomen yellow.
- Var. *rostrata*, Ern. Oliv.—Thorax strongly acuminate.

II. ANTENNÆ SIMPLE, FILIFORM.

1. *Hind angles of the thorax with one circular impression to their tip.*
8. *Ototreta borneensis*, Ern. Oliv.—Thorax piceous; elytra piceous with their tips black; antennæ black.

9. *Ototreta gravida*, Ern. Oliv.—Wholly fuscous.  
 10. *Ototreta varicornis*, Ern. Oliv.—Brownish; base of the elytra and last article of the antennæ yellow.  
 11. *Ototreta albicornis*, Ern. Oliv.—Thorax and scutellum fuscous; elytra yellow, with their tips narrowly black; last article of the antennæ pale yellowish.

(Genus doubtfully placed among the *Lampyridæ*, perhaps better with the *Drilidæ*.)

1. *Hind angles of the thorax without impression.*

1'. *Antennæ scarcely longer than the head.*

1''. *Thorax with diaphanous areolets.*

12. *Diaphanes moultoni*, Ern. Oliv.—Thorax, scutellum, and body testaceous; elytra fuscous with the suture and lateral margins very narrowly pale testaceous; margins of the thorax elevated in front.

1''. *Thorax without diaphanous areolets.*

13. *Lamprophorus boyei*, Motsch.—The largest of the family; elytra brown; thorax brown with testaceous margins, wider in front, narrow at the base.

1'. *Antennæ longer than the head.*

a. *The tip of the elytra in male folded down.*

14. *Pteroptyx decolor*, Ern. Oliv.—Eyes and antennæ fuscous; body wholly pale yellow; front of the thorax straightly truncate.  
 15. *Pteroptyx testaceum*, Motsch.—Eyes, antennæ, palpi and tarsi, fuscous; the whole body pale testaceous; front of the thorax sinuously produced.  
 16. *Pteroptyx validum*, Ern. Oliv.—Yellow; head, antennæ, tarsi and tip of the elytra black.

- a. *The tip of the elytra in male not folded.*
- b. *Last ventral segment of male with two long elevated appendices curved upwards.*
17. *Colophotia miranda*, Ern. Oliv.—Broad, convex, wholly testaceous; tibiæ, tarsi and antennæ fuscous.
18. *Colophotia brevis*, Ern. Oliv.—Testaceous; head, antennæ, tarsi and extreme tip of the elytra black.
- b. *Last ventral segment of male semicircular or mucronate, but not with two elevated appendices.*
19. *Luciola hamulata*, Ern. Oliv.—Testaceous, last ventral segment acuminate and curved upwards.
20. *Luciola substriata*, Gorrh.—Testaceous, with the extreme tip of the elytra fuscous; punctures of the elytra arranged in rows; apical ventral segment almost semicircular.
21. *Luciola pallescens*, Gorrh.—Broad and depressed, pale testaceous; thorax spotted with piceous.
22. *Luciola perspicua*, Ern. Oliv.—Testaceous; head, one fore spot on the thorax and the tip of the elytra black.
23. *Luciola nitescens*, Ern. Oliv.—Thorax, scutellum and body rufous; elytra black, with the base narrowly yellow.
24. *Luciola semimarginata*, Ern. Oliv.—Rufous; head black, elytra black, with the external margin narrowly rufous along half its base.
25. *Luciola maculipennis*, nov. sp.—Oblongo-elongata, flava; capite nigro, antennis, palpis, genibus, tibiis et tarsis piceis; prothorace flavo, convexo, transverso, antice attenuato, basi sinuato, in medio longitudinaliter sulcato, crebre punctato; scutello flavo, triangulari, tenue punctato; elytris elongatis, crebre et profunde sparsim punctatis, quadricostatis, pallide flavis, apice fuscis; ventre flavo, duobus ultimis segmentis cereis, ultimo sinuato, in medio postico triangulariter acuminato—Long. 13 mill. Sarawak, in mense Julii capto (in museo meo).

This is the first attempt to report on the fireflies of Borneo, and it must of necessity be very incomplete; but



it is hoped that it may at least form a foundation for future investigations, and I should be happy if the entomologists of the country would take up the study of these wonderful beetles. I shall be very grateful, too, if they will kindly communicate to me their captures through the Curator of the Sarawak Museum, and any observations made on the life and habits of these curious and interesting insects, whose eggs, successive changes in development, various kinds of food, &c., are totally unknown.

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